In the Claims:

1. (Currently Amended) A sensor arrangement ~~(10)~~ for detecting radiation having a layer sequence which contains, in the order indicated:

a holding substrate ~~(50)~~ which is permeable to the detectable radiation, at least in regions, or produces the detectable radiation when radiation impinges thereon and which holds a plurality of detection elements ~~(12a, 12b)~~ in the sensor arrangement ~~(10)~~,

at least one auxiliary layer ~~(22)~~ which is permeable to the detectable radiation and extends continuously over a set of the plurality of detection elements ~~(12a, 12b)~~ or which contains separate regions ~~(22a, 22b)~~ which are respectively associated with a detection element ~~(12a, 12b)~~,

a detection layer ~~(24)~~ with separate detection regions ~~(24a, 24b)~~ which are contained in a detection element ~~(12a, 12b)~~ and respectively contain at least one semiconductor component ~~(28b)~~ which is sensitive to the detectable radiation, and

an insulating layer ~~(40)~~ with separate insulating regions ~~(40b)~~ for electrically insulating the detection regions ~~(24b)~~ from a point of contact having electrically conductive connections ~~(36)~~ and pads fitted on a free side, the pads being electrically connected to connecting points which are routed to the semiconductor components.

2. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in claim 1, ~~characterized in that~~wherein the holding substrate ~~(50)~~ contains regions ~~(54a, 54b)~~ which are permeable to the detectable radiation and are respectively contained in a detection element ~~(12a, 12b)~~, and ~~in that~~ the holding substrate ~~(50)~~ contains, between the detection elements ~~(12a, 12b)~~, regions which absorb or reflect the detectable radiation.

3. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in claim 1 ~~or 2~~, ~~characterized in that~~wherein the holding substrate ~~(50)~~ contains at least one of:

a material which converts impinging particle radiation or radiation which is high in energy as compared with the detectable radiation into the detectable radiation, and~~/or in that the holding substrate (50) contains~~

a material which converts X-ray radiation into radiation which can be detected with a pin diode ~~(28b), preferably a highly absorbent semiconductor material or CdZnTe or PbO, or GaO sulfide~~.

4. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in ~~one of the preceding claims, characterized~~claim 1, wherein at least one of:

~~in that~~ at least one of the regions ~~(22a, 22b)~~ of the auxiliary layer, ~~(22) and/or~~ the detection regions, ~~(24a, 24b)~~ and~~/or~~ the insulating regions ~~(40a, 40b)~~ are separated by a filling material ~~(80)~~,

~~and/or in that~~ the filling material ~~(80)~~ is a plastic, ~~preferably an epoxy resin,~~ and~~/or~~

~~in that~~ the filling material ~~(80)~~ has been mixed with a material which absorbs or reflects the detectable radiation~~, preferably with titanium dioxide~~.

5. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in ~~one of the preceding claims, characterized~~ claim 1, wherein at least one of:

~~in that~~ the auxiliary layer ~~(22)~~ is a glass layer or a ceramic layer,

~~and/or in that~~ the insulating layer ~~(40)~~ is a glass layer,

~~and/or in that~~ the detection layer ~~(24)~~ contains a semiconductor support material, ~~preferably a silicon material and/or a thinned silicon material,~~ and~~/or~~

~~in that~~ the point of contact contains solder material ~~(36)~~.

6. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in ~~one of the preceding claims, characterized~~ claim 1, wherein at least one of:

~~in that~~ a detection area on the detection elements ~~(12a, 12b)~~ is smaller than five square millimeters ~~or smaller than one square millimeter~~, and~~/or~~

~~in that~~ the sensor arrangement ~~(10)~~ contains more than two hundred detection elements ~~(12a, 12b)~~.

7. (Currently Amended) The sensor arrangement ~~(10)~~ as claimed in ~~one of the preceding claims, characterized in that~~claim 1, wherein each of the semiconductor components ~~(28a, 28b)~~ contains a doped region of one conduction type, a doped region of another conduction type and, between ~~these~~ doped regions, an intermediate region which is undoped or is provided with a weak doping as compared with the doping of the other doped regions.

8. (Currently Amended) A computer tomograph~~,~~ comprising:

~~having~~ a radiation transmission unit for emitting radiation~~;~~, ~~preferably X-ray radiation,~~

~~having~~ a detection unit ~~(10)~~ for detecting the emitted radiation following ~~the~~ passage of the emitted radiation through a tissue which influences ~~the~~ a radiation intensity~~,~~; and

~~and having~~ an evaluation unit which ~~takes the~~receives output signals from the detection unit as the basis for producing image data for an image of ~~the~~ a structure of the tissue,

~~characterized in that~~wherein the detection unit contains a sensor arrangement ~~(10) as claimed in one of the preceding claims~~, the sensor arrangement comprising in the order indicated:

a holding substrate which is permeable to the emitted radiation, at least in regions, or produces detectable radiation when the emitted radiation impinges thereon and which holds a plurality of detection elements in the sensor arrangement,

at least one auxiliary layer which is permeable to the emitted or detectable radiation and extends continuously over a set of the plurality of detection elements or which contains separate regions which are respectively associated with a detection element,

a detection layer with separate detection regions which are contained in a detection element and respectively contain at least one semiconductor component which is sensitive to the emitted or detectable radiation, and

an insulating layer with separate insulating regions for electrically insulating the detection regions from a point of contact having electrically conductive connections and pads fitted on a free

side, the pads being electrically connected to connecting points which are routed to the semiconductor components.

9. (Currently Amended) A method for manufacturing a sensor arrangement ~~(10), in which the following steps are performed~~ the method comprising performing without any limitation by the order indicated:

manufacturing a large number of integrated radiation-sensitive semiconductor components ~~(28a, 28b) are manufactured~~ starting from a support substrate ~~(100)~~ made of semiconductor material of an initial thickness ~~(D1)~~,

mechanically connecting the support substrate ~~(100)~~ and an auxiliary substrate ~~(22) are mechanically connected~~ on one side of the support substrate, ~~which~~ the one side containing~~s~~ radiation-sensitive areas of the semiconductor components ~~(28a, 28b)~~,

thinning the support substrate ~~(100) is thinned~~ on ~~the~~ a bare side to a thickness ~~(D2)~~ which is less than the initial thickness ~~(D1)~~,

mechanically connecting a ~~the~~ free side of the support substrate ~~(100) is mechanically connected~~ to an insulating substrate ~~(40)~~,

disposing pads ~~(108 to 114) are put~~ on ~~the~~ a free side of the insulating substrate ~~(40)~~,

separating the insulating substrate is ~~separated~~ at ~~the~~ least one of: at boundaries between individual semiconductor boards having a large number of semiconductor components ~~(28a, 28b)~~ and~~/or~~ at ~~the~~ boundaries between the individual semiconductor components ~~(28b, 28b)~~, with the auxiliary substrate ~~(22)~~ not being separated,

electrically connecting the pads ~~(108 to 114) are electrically connected~~ to connecting points ~~(104)~~ which lead to the semiconductor components ~~(28a, 28b)~~,

mechanically connecting the auxiliary substrate ~~(22)~~ and a holding substrate ~~(50) are mechanically connected~~ on ~~the~~ a bare side of the auxiliary substrate ~~(22)~~, with the holding substrate being permeable to detectable radiation, at least in regions, or producing the detectable radiation when radiation impinges thereon, and

separating the auxiliary substrate ~~(22) is separated~~ at at least one of: the boundaries between the individual semiconductor boards and/~~or~~ individual semiconductor components ~~(28a, 28b)~~, with the auxiliary substrate ~~(50)~~ not being separated.

10. (Currently Amended) The method as claimed in claim 9, ~~characterized by the following step:~~ further comprising separating the thinned support substrate ~~(100) is separated~~ at at least one of: the boundaries between the individual semiconductor boards ~~having a large number of semiconductor components (28a, 28b)~~ and/~~or~~ the boundaries between the individual semiconductor components ~~(28a, 28b)~~, with the auxiliary substrate ~~(22)~~ not being separated and with at least one interconnect in a metallization layer of the semiconductor components ~~(28a, 28b)~~ being exposed at a connecting point ~~(104), the thinned support substrate (100) preferably being separated before the free side of the support substrate (100) is mechanically connected to the insulating substrate (40)~~.

11. (Currently Amended) The method as claimed in claim 9 ~~or 10, characterized by the following step: the~~ further comprising filling a separation point ~~(120) is filled~~ with a filling material ~~(80)~~.

12. (Cancelled)

13. (New) The sensor arrangement as claimed in claim 1, wherein the holding substrate contains at least one of a highly absorbent semiconductor material, CdZnTe, PbO, and GaO sulfide.

14. (New) The sensor arrangement as claimed in claim 1, wherein the filling material is an epoxy resin.

15. (New) The sensor arrangement as claimed in claim 1, wherein the filling material is mixed with titanium dioxide.

16. (New) The sensor arrangement as claimed in claim 1, wherein the detection layer contains silicon.

17. (New) The computer tomograph as claimed in claim 8, wherein the emitted radiation is X-ray radiation.

18. (New) The method as claimed in claim 9, wherein the thinned support substrate is separated before the free side of the support substrate is mechanically connected to the insulating substrate.